UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

July 16, 2007

Mr. James F. Williamson, Jr.
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

SUBJ: EPA's NEPA Review of TVA's DEIS for the "Bear Creek Dam Leakage Resolution Project"; Franklin County, Alabama

Dear Mr. Williamson:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject Tennessee Valley Authority (TVA) Draft Environmental Impact Statement (DEIS) in accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. TVA proposes to repair or remove Bear Creek Dam in compliance with federal dam requirements and resolve a public safety concern stemming from continued leakage through the dam. As a consequence to this proposed action, the pool elevation of the Bear Creek Reservoir and associated downstream flows would be modified which in turn would affect shoreline wetlands.

Bear Creek Dam and Reservoir are part of the overall Bear Creek Project that involves four dams and reservoirs within the Bear Creek Watershed. The project was designed for flood control, recreation, economic development and water supply. Bear Creek Dam is a 68-ft high and 1,385-ft long earthen dam constructed in 1967-1969 using compacted clays and existing rock formations. Bear Creek Reservoir is a 630-acre lake that impounds 9,600 acre-feet of water at full pool (576 ft). The ecological health of the Bear Creek Reservoir has been rated as only "fair" or "poor" in the categories of dissolved oxygen (DO), algal chlorophyll, fish and benthos (sediments were rated as "good"). These parameters in turn affect recreational fishing success, although the reservoir rating for fish was recently upgraded from "fair" to "good" in 2005. Among its diverse inhabitants, the system contains three federally-protected mussel species and one candidate for listing as well as other state-protected and common mussel species that require flowing water.

Historically, Bear Creek Dam has leaked excessively through its foundation (karstic limestone) despite several TVA attempts to grout the dam. As such, the downstream communities are at risk of dam failure during summer rainy periods when pool levels rise well above desired levels (a 576-ft summer pool, which has been lowered by TVA to a working level of 568 ft for safety, and a 565-ft winter pool). Since this unacceptable risk is inconsistent with the federal dam safety requirements to safely pass

the probable maximum flood (PMF), TVA is proposing several dam repair or removal alternatives to provide a long-term solution to the continuing leakage problem.

In contrast to the rainy season, flows from the dam during drier and drought periods (including periods of essentially no flows) can be insufficient for downstream endangered and common species of mussels and other aquatic biota. In a Biological Opinion, the U.S. Fish and Wildlife Service (FWS) has recently established seasonal minimum flows for Bear Creek Dam. TVA would operate the dam to implement these minimum flows (with a default to 21 cfs during severe droughts) for some alternatives while others would operate in the run-of-river mode.

EPA agrees with TVA that a long-term solution to the continuing leakage issue is appropriate from a federal compliance and flood protection safety perspective. Although we have offered some comments below, we will defer to TVA engineers regarding the best alternative to achieve that end. We will also primarily defer to the FWS regarding minimum flows, wetted areas, and other requirements of downstream federally-protected mussels and other aquatic species and to the Alabama Department of Environmental Management (ADEM) for minimum flows to meet downstream water quality standards. We have therefore concentrated our comments on the effects of the preferred and other presented alternatives on reservoir and downstream wetlands/water quality, which are of more direct concern to EPA and its mandates than TVA's engineering, economic and safety mandates.

Alternatives Description

In addition to the NEPA No Action Alternative (1), three action alternatives were presented in the DEIS (2, 3 & 4). We note that TVA has selected Alternative 2 as its preferred alternative in the DEIS, although a preference for one of three options to implement Alternative 2 (2a, 2b or 2c) was not identified. Alternative descriptions are as follows:

* Alternative 1 (*No Action*) – This alternative would not resolve the leakage and safety problem of Bear Creek Dam but would incorporate the new FWS minimum downstream flows in an attempt to prevent periods of no flows.

* Alternative 2 (*Modify Dam and Maintain Summer Pool Level of 576 feet*) – This alternative would not only implement the new FWS minimum flows but also proposes to repair the dam at or slightly downstream of the existing site. Alternative 2 is TVA's preferred alternative. All repairs would involve construction of a vertical cutoff wall down to bedrock, with the top of the dam being 618-631ft. The summer pool would return to the original 576-ft design as opposed to the current 568 ft pool.

Subalternatives 2a, 2b and 2c differ by engineering design. All include a vertical cutoff wall to bedrock, but 2a and 2b also include possible earthen fill in the tailrace area and 2a additionally includes a rolled concrete dam in the tailrace area. We will defer to TVA

regarding which design option is appropriate, but note that 2a appears to be the most substantial because of the concrete dam addition.

* Alternative 3 (*Lower Dam and Maintain Summer Pool Level of 565 feet*) – Alternative 3 proposes to armor the top of the existing dam as a PMF modification and allow overtopping of the dam (565 ft). Alternative 3 would therefore operate the dam at run-of-river rather than minimum flows, which would result in a lower summer pool of 565 ft (same as winter pool) and provide more water downstream for mussels and other aquatics (but also allow some possible downstream flooding). However, the lower pool would make the access of the public water supply intake at 560 ft less certain as well as its water quality of the source water since it would be close to the surface (i.e., surface water quality is reduced by algal growth and minerals in the photic zone). The reduced surface water quality of the source water would impact the performance of the new water treatment plant.

* Alternative 4 (*Remove the Dam and Restore the Former Creek Channel*) – This alternative proposes to decommission the dam and allow the return to a free-flowing riverine system along the original Bear Creek channel. Sediments that have accumulated at the forebay would need to be removed (dredged) and properly disposed prior to decommissioning. There would be agricultural and structural flooding consequences to this alternative. Structurally, a weir would need to be constructed to allow continued functioning of the water intake as well as a bridge over Bear Creek to replace the county road over the top of the to-be-removed dam.

Environmental Impacts & Significance

Based on the above physical descriptions of dam repair or removal alternatives, EPA makes the following observations on the environmental impacts associated with the alternatives, with emphasis on their significance on water quality and wetlands:

* Alternative 1 – This alternative would not resolve the leakage problem, although minimum flows would nevertheless be implemented to benefit downstream aquatics. *Significance (Alt. 1) – Implementation of increased new FWS minimum flows, but the same unacceptable risk of dam failure would remain.*

* Alternative 2 – Alternative 2 would repair the leakage through the dam and operate the reservoir at its original summer pool of 576 ft. However, returning to this design elevation would likely inundate some reservoir fringe wetlands (77 ac) since the working level of the summer pool has been lowered to 568 ft. This could also affect forested wetlands in the upper (inflow) portion of the reservoir (because the reservoir is steep-banked, this may not be as significant). Compliance with the new FWS minimum flows might also inundate some downstream wetlands. However, it is likely that wetlands would regenerate at the new pool level and stream flows over time. Nevertheless, there would at least be an unavoidable temporal loss in wetland function until such new wetlands are re-established. Also, since the reservoir would return to a 576-ft summer pool instead of a 568-ft pool (8-ft difference), Alternative 2 would likely impound a

greater volume of low-DO water (i.e., the reverse of Alternative 3 below, which would lower the pool to 565 ft and reduce the volume of low-DO water). *Significance (Alt. 2) – Return to original reservoir pool design in addition to implementation of new FWS minimum flows, but some actual and/or temporal impacts to reservoir fringe wetlands are expected due to a higher pool.*

* Alternative 3 – This alternative would have the environmental benefit of providing more downstream flows that would benefit mussels and other aquatics. The lower pool and reduced residence time would also minimize low-DO reservoir waters. However, unlike Alternative 2, the dam would be armored and remain at a lower elevation (565 ft) and allowed to overtop, which could result in some downstream flooding. Environmentally, however, this run-of-river mode of operation is beneficial since it mimics more natural riverine conditions. *Significance (Alt. 3) – Change to a run-of-river mode operation resulting in the beneficial shorter periods of low-DO water in the reservoir and greater flows and more riverine conditions downstream, but at some risk of downstream flooding due to a lower pool and run-of-river flows.*

* Alternative 4 – This alternative would change the current lake (lentic) system to its original riverine (lotic) system (even more so than Alternative 3). Returning to a riverine system is generally favorable for downstream aquatics such as mussels and other assemblages requiring flows. However, reservoir fringe wetlands would be desiccated (77 ac) including forested wetlands in the inflow reservoir. This alternative would also require dredging of sediments that have accumulated over time at the forebay of the dam. While these sediments were determined to be generally clean (with the exception of some lead hot spots), these sediments would require proper disposal. Some downstream sedimentation would still be likely within the original Bear Creek channel, Bear Creek Floodway, and Bear Creek margins. The risk of flooding would also greatly increase without the presence of a dam, affecting agricultural croplands and overtopping structures. Also, the absence of an impoundment would affect groundwater recharge. *Significance (Alt. 4) – Return to a dam-free system with the associated benefits of a natural riverine system along the original Bear Creek channel, but at the expense of downstream flooding of agricultural areas and overtopping of structures, desiccation of reservoir fringe and forested wetlands, probable lowering of the water table (potentially affecting wetlands and remaining local wells), and some downstream sedimentation if prerequisite dredging at the forebay is insufficient.*

Informational Requests

The Final EIS (FEIS) should provide the following additional information.

* Wetland Impacts – The FEIS should clarify if the 77 acres of wetlands that would be lost for Alternative 2 and 4 includes referenced forested wetlands in the inflow reservoir area, or just fringe wetlands along the reservoir shoreline in general. Downstream wetland losses or gains should also be reasonably estimated for each alternative.

For each alternative, it should be determined if there would be an overall net loss or gain of wetlands at the final pool level and downstream flows. At a minimum, there would be an interim temporal loss of wetland function since some wetlands would be inundated or desiccated and time would be needed for wetlands to be re-established (regenerated) along the new shoreline.

* Wetland Mitigation – TVA should coordinate closely with their cooperating agency, the U.S. Army Corps of Engineers (COE), regarding the probable need for wetland compensation for this proposed action. Section 404 permitting should be summarized in the FEIS.

* Working 568-ft Pool – The FEIS should indicate how long Bear Creek Reservoir has been operating at 568-ft pool as opposed to the 576-ft design level. Similarly, how long did it take for wetlands to regenerate at the new 568-ft shoreline?

* Shoreline Re-vegetation – We request that a brief summary regarding the reasons to believe that wetlands will naturally regenerate with a change in pool elevation and downstream flows. Elements to consider include shoreline topography (slope), magnitude of the changes in elevation (ft), changes in downstream flows (cfs) and potential for soil erosion.

* Construction Times – The FEIS should provide approximate construction timeframes for the repair or removal of the dam for each action alternative proposed. This timeframe relates to the magnitude of possible water quality impacts to Bear Creek during construction.

In addition to these requests for information, the FEIS should be responsive to the following recommendations.

EPA Recommendations

* Avoidance & Minimization -- Whatever alternative is selected by TVA, EPA recommends that net losses of wetlands within the project area be avoided, and that unavoidable temporal losses be minimized. Best Management Practices for water quality controls during construction and any reservoir dredging (Alt. 4) should also be part of project implementation. Therefore, wetland regeneration and water quality controls should be considered along with project engineering, economics and flood control mandates.

* Wetland Compensation – As suggested above, the wetlands lost due to the implementation of an action alternative should be determined by alternative (at a minimum, for the preferred alternative). Compensation for actual and/or temporal wetland losses should be compensated through coordination with the COE (Section 404 permitting agency) and the FWS, EPA and other resource agencies.

* Shoreline Erosion & Re-vegetation – Until fringe wetland and riparian vegetation naturally regenerate along new shorelines through maintenance of more stable pool elevations, shoreline buffers may need to be artificially provided for soil erosion control. We recommend that TVA assess this and provide such artificial structures as needed. During this transitional period of regeneration, we also recommend that TVA monitor the natural regeneration process and promote success where necessary.

* Watershed Management Team – Referring to water quality issues, page 34 indicates that "[o]ngoing issues stemming from the presence of the floodway and from land- and water-use practices downstream of Bear Creek Dam would continue at current levels under any alternative." While the purpose and need of the project centers on Bear Creek Dam operation more so than water quality improvements, operation of the dam and Bear Creek water quality are related. Given the reservoir's water quality issues of low-DO and non-point source runoff, we suggest that this project could offer an excellent opportunity to enhance reservoir and downstream water quality. That is, TVA and local entities within the Bear Creek Watershed could collectively form a "Bear Creek Watershed Management Team". This watershed team that would seek to reduce non-point source runoff from agricultural, silvicultural and other sources and promote natural buffer areas surrounding the reservoir (fringe wetlands and riparian vegetation) to reduce soil erosion of the reservoir shoreline and shorelands. Such measures would involve coordination of agricultural Best Management Practices and might include land use changes such as cropland conversion back to natural successional areas in strategic drainage areas of the watershed. Overall, these measures should improve the water quality of the Bear Creek system.

Summary

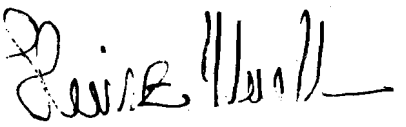
From a safety, flood control and PMF compliance perspective, EPA supports this project and gives deference to TVA regarding the appropriate engineering alternative for implementation. Environmentally, we support the fact that all alternatives (even the no action) would provide greater downstream flows that would benefit mussels and other aquatics and essentially eliminate no-flow conditions. However, there would be some unavoidable temporal functional losses of reservoir fringe wetlands and possibly downstream wetlands due to changes in reservoir pool elevations and downstream flows. There could also be a net wetland loss (or gain) and overall environmental benefits/losses would vary by alternative. Actual and/or temporal wetlands losses should be documented and compensated through coordination with the COE, FWS, EPA and other resource agencies. We also recommend that TVA monitor the regeneration of wetlands and riparian vegetation along the reservoir and downstream shorelines and provide interim soil erosion control measures as needed and promote the success of the re-vegetation process. We further suggest that a Bear Creek Watershed Team be formed to include TVA and other local entities for the overall water quality improvement of the Bear Creek system.

EPA DEIS Rating

EPA rates this DEIS as "EC-2" (Environmental Concerns, additional information requested in the FEIS). Although EPA fully supports compliance with federal dam safety requirements, we base this rating on the actual and/or temporal losses of wetlands due to the changes in reservoir pool elevations and downstream flows.

We appreciate the opportunity to review this DEIS. Should you have questions on our comments, please contact Chris Hoberg of my staff at 404/562-9619 or hoberg.chris@epa.gov.

Sincerely,



Heinz J. Mueller, Chief
NEPA Program Office
Office of Policy and Management